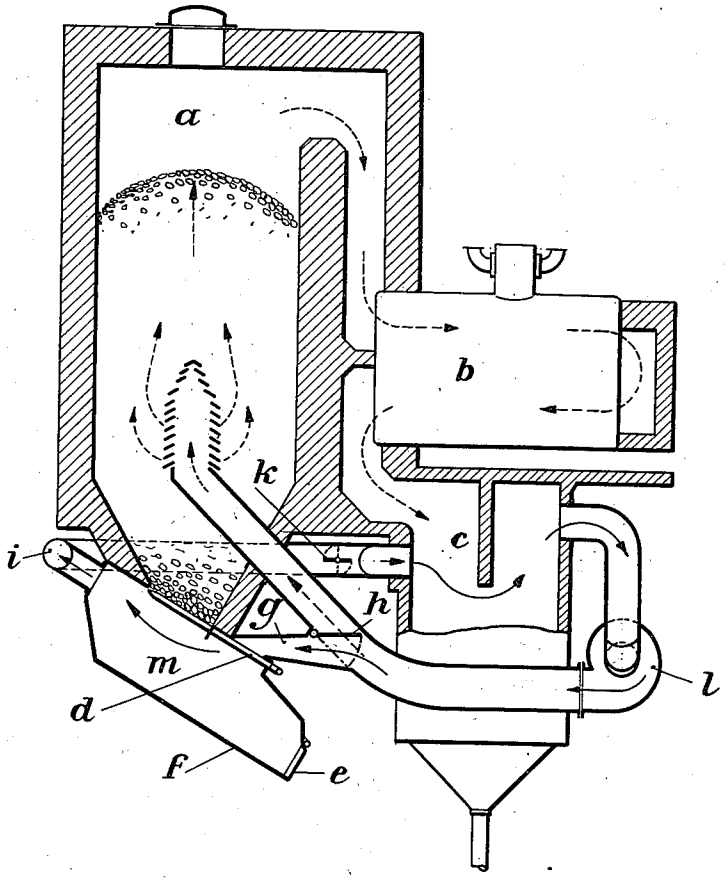
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DRY COOLING OF COKE

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Fig.1



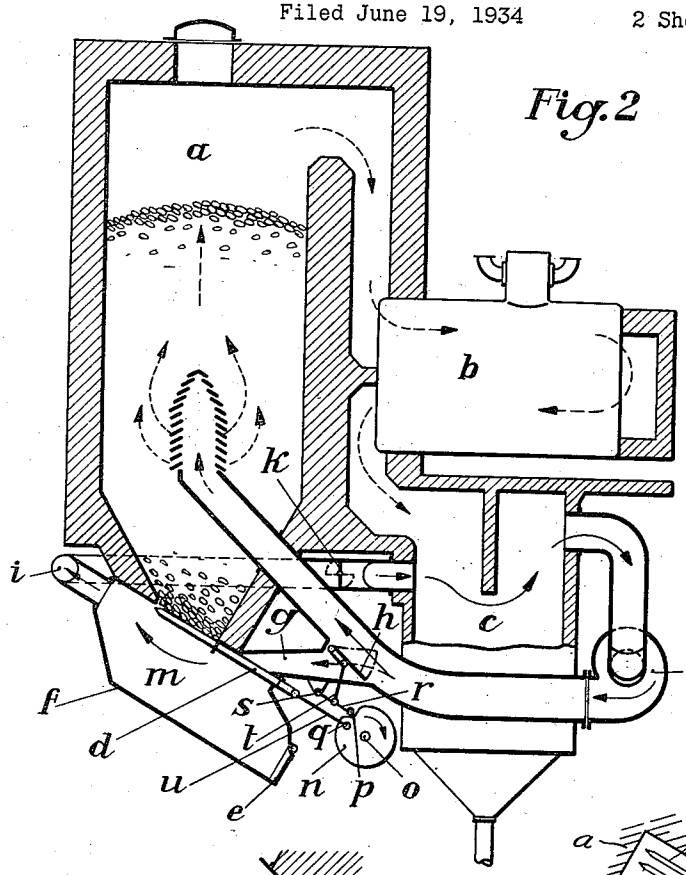
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Fig. 2



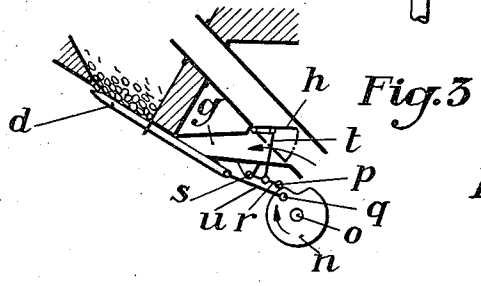


Fig. 3

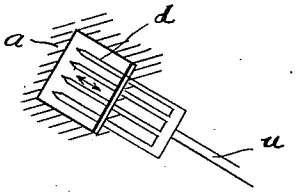


Fig. 5.

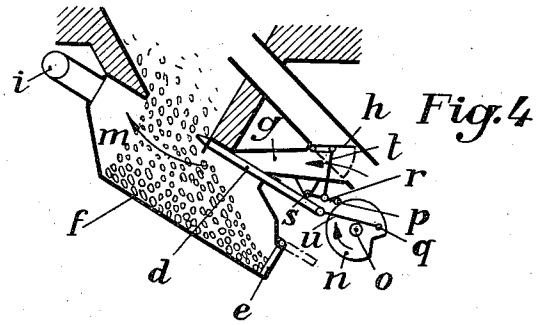


Fig. 4

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2,048,193

DRY COOLING OF COKE

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Application June 19, 1934, Serial No. 731,251
In Switzerland July 1, 1933

6 Claims. (Cl. 202—228)

This invention relates to the dry cooling of coke, and the removal of dust therefrom. According to this invention apparatus for dry cooling of coke has a discharge chamber into or through which the cooled coke passes, and means for blowing a gas through the coke in the discharge chamber before its discharge, to remove coke dust.

The gas, after leaving the discharge chamber, may be passed through a dust separating chamber to remove the coke dust from it.

In a plant in which the coke is cooled by means of a current of gas flowing in a closed circuit through a heat exchanger, the same blower or other means employed to produce the cooling gas current may serve also to produce the gas current through the discharge chamber.

Two specific embodiments of the invention are shown diagrammatically by way of example in the accompanying drawings, in which

Figure 1 is a sectional elevation of a coke cooling plant embodying the invention.

Fig. 2 is a view similar to Fig. 1 with the several valves shown in positions which are different from those shown in Fig. 1;

Figs. 3 and 4, together with Fig. 2, show the valves and their actuating mechanism in various positions; and

Fig. 5 is a diagrammatic detail view showing the construction of the slide at the bottom of the coke cooling chamber.

For the purpose of cooling, the coke is received in a chamber *a* through which gas is blown in a closed circuit. The gas passes from the chamber *a* through a heat exchanger *b*, such as a steam generator, into a dust separating chamber *c*. From the separating chamber *c* the gas is drawn through a fan *l*, and delivered, as indicated by the dotted arrows, back into the cooling chamber.

The chamber is filled through an opening in the top, and after a charge of coke has been cooled it is withdrawn at the bottom by opening a slide *d* as shown in Figure 2. From the cooling chamber the coke passes into a discharge chamber *f* from which it can be discharged by means of a discharge valve *e* into trucks positioned below the plant. The discharge chamber *f* is connected at one point by means of a pipe *g* and a valve *h* to the delivery pipe from the fan *l*. At another point on the opposite side of the outlet from the cooling chamber, the discharge chamber communicates through a pipe *i* and rotary valve *k* with the dust separating chamber.

While the coke is being cooled, the valves *h* and *k* are locked in the positions shown in full lines in Fig. 2 so that the interior *m* of the discharge chamber *f* is disconnected from the cooling gas circuit.

When the slide *d* is opened to discharge the coke, the valve *k* is opened and the valve *h* moved to the position in which it admits gas to the pipe *g* and the discharge chamber as shown in Fig. 1. The gas so admitted will pass through the discharge chamber and through the coke falling into it, and will free the latter of the coke dust still remaining in it and carry such dust through pipe *i* into the separating chamber where it will be deposited.

When a further cooling operation is to be begun, the slide *d* will be closed and the valves *h* and *k* brought back to their original positions.

Thus the cooled coke can be completely freed from any undesirable coke dust before being discharged from the plant.

Means may be provided for interconnecting the valves *h* and *k* with the slide *d* for discharging the coke so that they will be automatically opened and closed by the latter.

In Figs. 2, 3, and 4 such means are shown in three various positions.

n is a cam which can turn about the axis *o* and works in connection with a cam roller *p* and with a crank pin *q*. *r* is a lever, which is pivoted at the fixed point *s* and carries the cam roller *p* and is connected through the link *t* with the valve *h*, and also through a link (not shown) in a similar manner with the valve *k*. *u* is a link connecting the crank pin *q* with the slide *d*.

In the position shown in Fig. 2 the whole arrangement is set for the cooling operation, i. e. the valves *h* and *k* are set in such a manner that they close the passages *g* and *i* and open the passages provided for the cooling gas.

If the cam is turned in the direction of the arrow into the position shown in Fig. 3, the valve *h*, while the slide *d* remains closed, is moved in such a way that it opens the passage *g* and closes the cooling gas pipe leading to the cooling chamber, and the valve *k* is opened, so that the cooling gases delivered by the blower *l* pass through the coke-discharge space *m* instead of through the cooling chamber. If the cam is then turned further into the position shown in Fig. 4, the slide *d* is opened, whilst the positions of valves *h* and *k* remain unaltered, and the cooling gases are, as described above, led through the coke falling into the discharge space, so that the coke is completely freed of dust when it leaves the plant.

If the cam is then turned further in the direction of the arrow until it comes back into the position shown in Fig. 2, the slide *d* is first of all closed again and then the valves *h* and *k* are turned back into their original positions, i. e. the coke-discharge space *m* is shut off from the cooling-gas circuit and the cooling gases are again led in the usual way through the cooling chamber. Such means may be adjusted if desired so that the valves *h* and *k* are only partially opened and closed.

I claim:

1. In an apparatus for the dry cooling of coke, a coke cooling chamber containing a mass of coke to be cooled, a heat exchanger associated therewith, means for circulating gas in closed circuit between said coke cooling chamber and said heat exchanger to effect the cooling of said coke, a chamber associated with said coke cooling chamber adapted to receive cooled coke therefrom, a gate for controlling the passage of coke from the coke cooling chamber to said second chamber, means for so operating the gate as to regulate the discharge of the coke from said cooling chamber to said second chamber and to cause the coke to fall into said second chamber in dispersed formation, and means for diverting gas from said coke cooling circuit and causing the same to flow transversely through said falling coke to remove dust particles directly therefrom.

2. In an apparatus for the dry cooling of coke comprising a coke cooling chamber, a heat exchanger and a dust separating device arranged in closed circuit and provided with means for circulating gas therein, the combination of a coke discharge chamber into which the cooled coke from the coke cooling chamber is adapted to flow by gravity, a connection for removing gas from said closed circuit on its way to the coke cooling chamber and passing the same through the stream of coke entering said discharge chamber, and a second connection for conveying dust-laden gas from said discharge chamber to said dust separating device.

3. In an apparatus for the dry cooling of coke comprising a coke cooling chamber, a heat exchanger and a dust separating device arranged in closed circuit and provided with means for circulating gas therein, the combination of a coke discharge chamber into which the cooled coke from the coke cooling chamber is adapted to flow by gravity, a connection for removing gas from said closed circuit on its way to the coke cooling chamber and passing the same through the coke in said discharge chamber, a second connection for conveying dust-laden gas from said discharge chamber to said dust separating device, a gate for controlling the discharge of coke into said discharge chamber, a gas-admission valve for controlling the admission of gas to said discharge chamber, a valve for controlling the flow of the dust-laden gas from said discharge chamber, and means for coordinating the operation of said valves with respect to the opening and closing of said gate.

4. In apparatus for the dry-cooling of coke, a coke cooling chamber having an outlet at the lower end thereof, a gate for said outlet, a passage for conducting cooling gas into said chamber, a valve controlling the passage of gas through said passage, a discharge chamber positioned beneath said cooling chamber for receiving coke therefrom, means for operating the gate for the outlet of the cooling chamber to permit coke in said chamber to fall freely into said discharge chamber, means for forcing gas through said passage and transversely through the falling coke to blow dust particles directly therefrom, a passage for conducting a gas into said discharge chamber, and means for coordinating the operation of said valve with respect to the opening and closing of said closure.

5. In apparatus for the dry-cooling of coke, a coke cooling chamber having an outlet at the lower end thereof, a gate for said outlet, a passage for conducting cooling gas into said chamber, a discharge chamber positioned beneath said cooling chamber for receiving coke therefrom, means for operating the gate for the outlet of the cooling chamber to permit coke in said chamber to fall freely into said discharge chamber, a passage for conducting a gas into said discharge chamber, means for forcing gas through said passage and transversely through the falling coke to blow dust particles directly therefrom, a valve controlling the passage of gas through said passage, and means for coordinating the operation of said valve with respect to the opening and closing of said closure, so that said valve is opened before the closure has moved to its fully open position and is closed after the closure has closed.

6. In apparatus for the dry-cooling of coke, a coke cooling chamber having an outlet at the lower end thereof, a gate for said outlet, a discharge chamber positioned beneath said cooling chamber for receiving coke therefrom, means for so operating the gate for the outlet of the coke cooling chamber as to regulate the discharge of the coke from said cooling chamber to said discharge chamber and to cause the coke to fall into said discharge chamber in dispersed formation, and means for forcing a current of gas transversely through the coke as it falls into said discharging chamber to blow dust particles directly from the falling coke.

ARNOLD MOETTELI.

CERTIFICATE OF CORRECTION.

Patent No. 2,048,193. July 21, 1936.

ARNOLD MOETTELI.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, lines 17 to 19 inclusive, claim 4, strike out the words and comma "means for forcing gas through said passage and transversely through the falling coke to blow dust particles directly therefrom," and insert the same after the comma and before "and" in line 21, same claim; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of September, A. D. 1936.

Henry Van Arsdale

(Seal) Acting Commissioner of Patents.